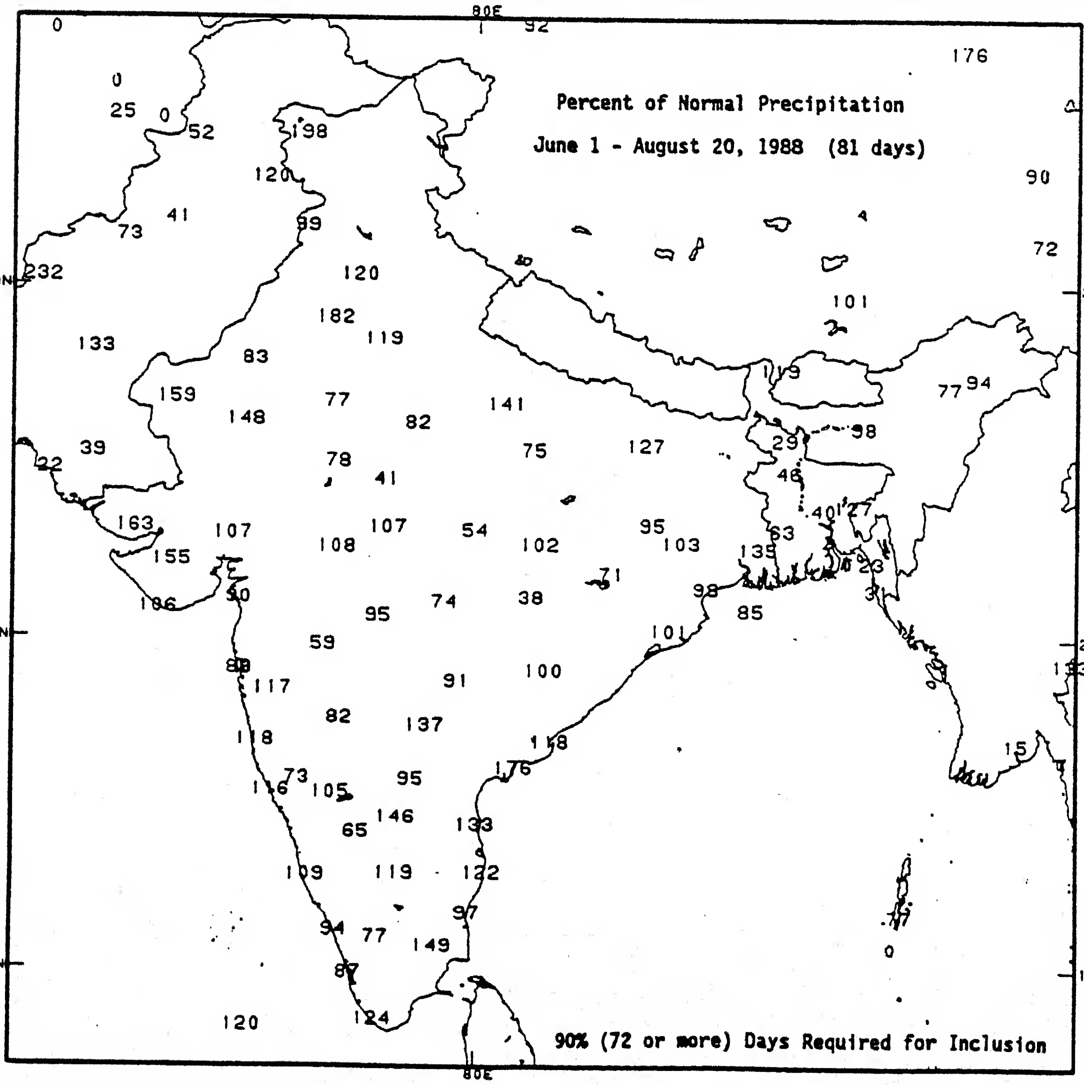
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 88/34 Washington, DC August 20, 1988



IN SHARP CONTRAST TO LAST YEAR'S FAILURE OF THE MONSOON, ESPECIALLY THROUGHOUT NORTHWESTERN INDIA AND PAKISTAN, PRECIPITATION AMOUNTS SINCE JUNE 1 HAVE GENERALLY BEEN NEAR TO ABOVE NORMAL. FOR UPDATES ON BOTH THE INDIAN MONSOON AND THE AFRICAN SAHEL RAINY SEASON, REFER TO THE SPECIAL CLIMATE SUMMARIES.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

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This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

Highlights of major global climatic events and anomalies.
U.S. climatic conditions for the previous week.
U.S. apparent temperatures (summer) or wind chill (winter).
Global two-week temperature anomalies.
Global four-week precipitation anomalies.
Global monthly temperature and precipitation anomalies.
Global three-month precipitation anomalies (once a month).
Global twelve-month precipitation anomalies (every 3 months).
Global temperature anomalies for winter and summer seasons.
Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

To receive copies of the Bulletin or change mailing address, write to:

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Phone: (301)-763-8071

GLOBAL HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF AUGUST 20, 1988
(Approximate duration of anomalies is in brackets.)

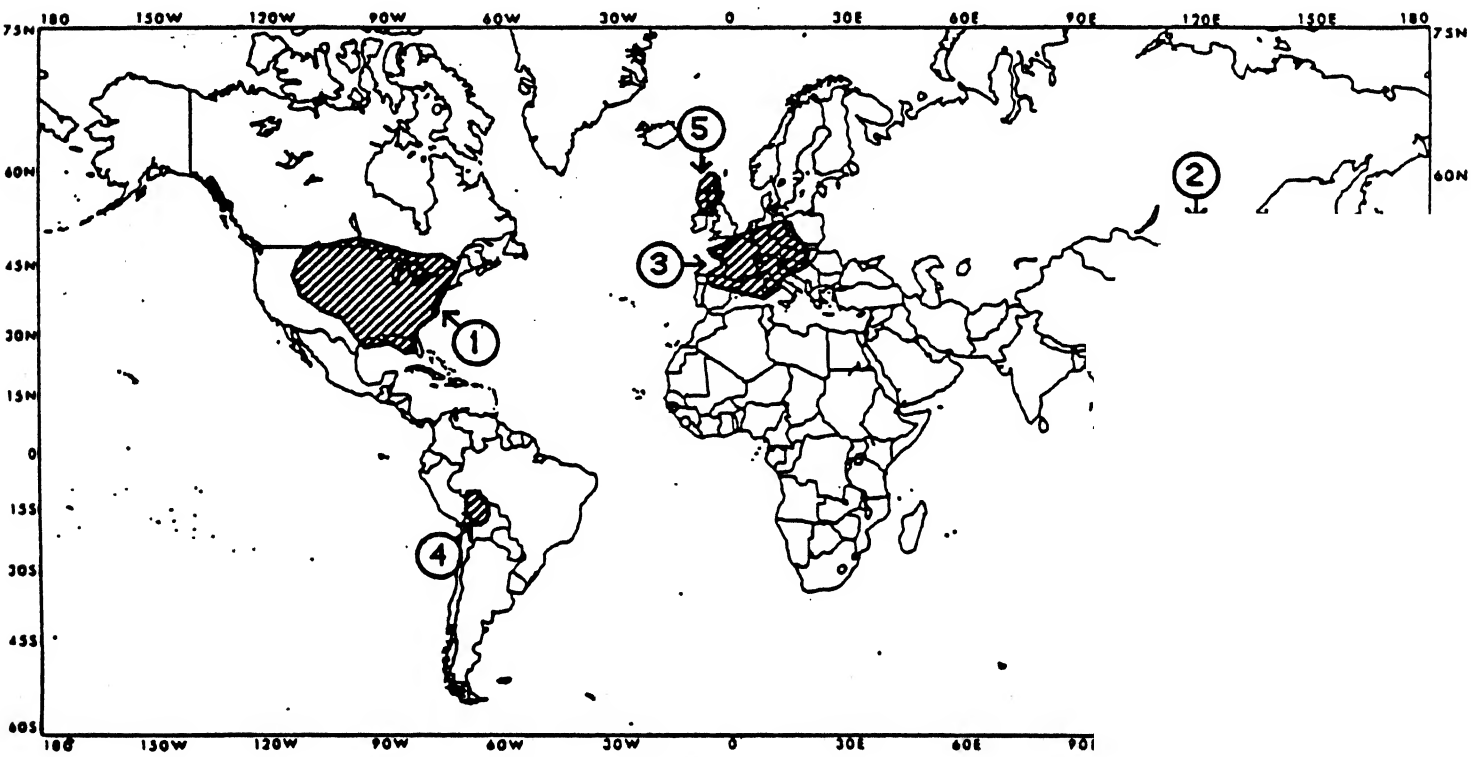
1. United States:
COOLER AIR BRINGS RELIEF.
Unusually warm conditions, with temperatures up to 7.4°C (13.3°F) above normal, persisted; however, a slow-moving cold front triggered thunderstorms and heavy rains as it penetrated the United States and brought some relief from the hot, dry conditions. See U.S. Weekly Weather Highlights for more details [23 weeks dry - 16 weeks warm].

2. China:
CONDITIONS RETURN TO NORMAL.
Moderate to heavy rain, up to 182.0 mm (7.17 inches), fell in previously dry areas of China while many areas that were unusually wet reported little or no precipitation [Ending at 10 weeks].

3. Europe:
AREA REMAINS UNUSUALLY HOT.
Temperatures averaged up to 5.9°C (10.6°F) above normal as unusually warm weather persisted in much of southern and central Europe [8 weeks].

4. Bolivia:
COOL CONDITIONS END.
Temperatures returned to near seasonal normals across most of Bolivia; however, isolated pockets of below normal temperatures remained [Ended at 6 weeks].

5. Scotland:
HEAVY RAINS RETURN.
Many stations measured up to 83 mm (3.27 inches) of precipitation as unusually wet conditions returned [7 weeks].



Approximate locations of the major anomalies and events described this map. See the other world maps in this Bulletin for current anomalies, four-week precipitation anomalies, and (occasionally) 1

U.S. WEEKLY WEATHER HIGHLIGHTS

FOR THE WEEK OF AUGUST 14 THROUGH AUGUST 20, 1988

A tropical disturbance produced inundating showers and thunderstorms along the eastern Gulf Coast and southern Atlantic Coast last week as amounts of 3-6 inches were found at scattered locations in southern Louisiana and northwestern, north-central, and southeastern Florida, with a few stations in the latter area reporting more than 10 inches (see Figure 1 and Table 1). Isolated thundershowers dumped heavy rains on portions of central Arizona, southern New Mexico, and extreme southern Texas, while farther north, a strong cold front triggered severe thunderstorms in northern Minnesota and the Upper Peninsula of Michigan. As the front progressed to the south and east, its movement slowed and widespread moderate to heavy precipitation fell from the Middle Mississippi Valley eastward to the mid-Atlantic region. Largest totals (between 2-4 inches) occurred in the Tennessee Valley (see Figure 2) and the central parts of Virginia and North Carolina. Elsewhere, heavy rainfall was measured in southeastern Alaska and extreme northern New England. Light to moderate amounts were observed in the southern third of the Intermountain Region, along the Pacific Northwest Coast, in the southern halves and the extreme northern portions of the Great Plains and Rockies, and throughout much of the nation east of the Mississippi River. Little or no precipitation was recorded in the western U.S., the northern halves of the Rockies and Great Plains, southwestern Texas, in eastern South Dakota, southern Minnesota, northern Iowa, and central Wisconsin, and in parts of Connecticut, Rhode Island, and eastern Massachusetts. The areal coverage of regions with less than half their normal precipitation continued to shrink (see Figure 3) as compared to the "peak" drought conditions in late June (see last week's Weekly Climate Bulletin, page 10), but a large area with less than 75% of normal precipitation since April 1 still remained throughout the eastern U.S.

Abnormal warmth covered much of the eastern two-thirds of the country until a surge of cooler and drier Canadian air penetrated the Great Lakes, New England, and mid-Atlantic regions late in the week. The cooler weather, however, failed to reach most of the Great Plains and lower Midwest as departures of +9 to +14°F were common from southern Minnesota southeastwards to Kentucky (see Table 2), while much of the Missouri, Ohio, and Tennessee Valleys reported temperatures more than 6°F above normal. Highs reached or exceeded 100°F (114°F at Pierre, SD on 8/15 and 106°F at Fayetteville, NC on 8/18) as several locations in the Great Plains, Midwest, Tennessee Valley, and mid-Atlantic areas set new daily record maximum temperatures during the week (see Figure 4). Even with the passage of the cold front, temperatures still averaged slightly above normal in the Great Lakes, mid-Atlantic, and southern New England, while much of the Rockies, Southeast, Alaska, and Hawaii experienced similar conditions. Cooler than normal weekly temperatures were confined to sections of the western, southwestern, and the extreme northeastern and southeastern United States. Departures less than -3°F were limited to the southern California Coast, southern Nevada, the Pacific Northwest Interior, and the Rio Grande Valley.

TABLE 1. Selected stations with more than two inches of precipitation for the week.

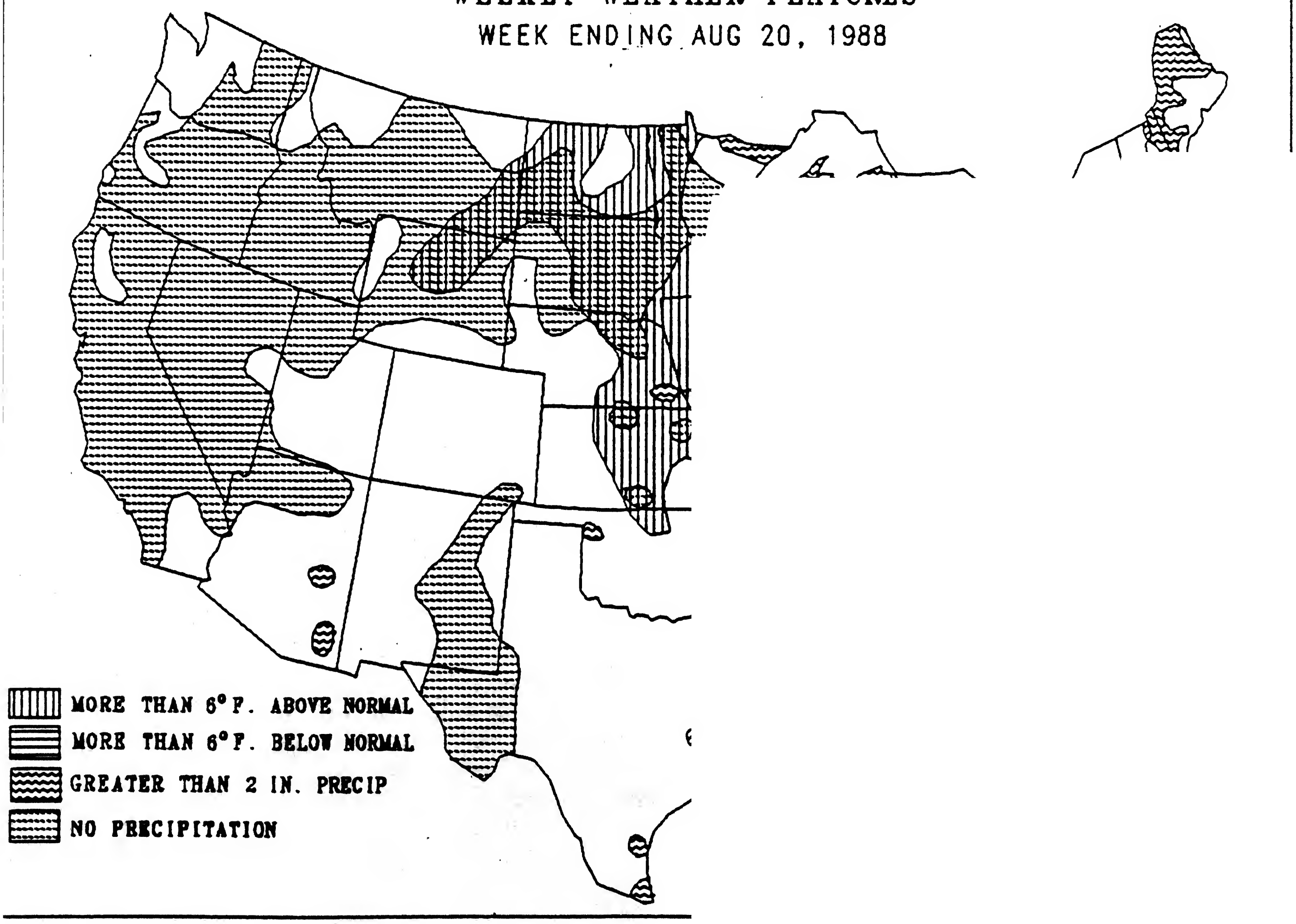
Homestead AFB, FL	14.16	Tampa/Mac Dill AFB, FL	2.74
West Palm Beach, FL	10.11	Valdosta, GA	2.57
Apalachicola, FL	6.71	Concord, NH	2.54
Panama City/Tyndall, FL	6.02	Dover AFB, DE	2.49
Pensacola NAS, FL	5.71	Anniston, AL	2.46
Miami, FL	4.30	Norfolk/NAS Chamber, FL	2.45
Mt. Washington, NH	4.00	Marquette, MI	2.38
Tampa, FL	3.88	New Orleans/Lake Front, LA	2.37
Yakutat, AK	3.64	New Orleans NAS, LA	2.30
Gainesville, FL	3.46	Pensacola, FL	2.26
Kingsville NAS, TX	3.39	Brunswick NAS, ME	2.24
Crossville, TN	3.33	Key West NAS, FL	2.23
International Falls, MN	3.19	Norfolk, VA	2.18
Lansing, MI	3.18	Burlington, IA	2.17
Key West, FL	2.96	Brownsville, TX	2.14
Oceana/NAS Soucek, VA	2.90	Lufkin, TX	2.08
New Orleans/Moisant, LA	2.82	Hancock/Houghton Co., MI	2.06
Savannah/Hunter AFB, GA	2.82	Hampton/Langley AFB, VA	2.04
Toledo, OH	2.80	Tallahassee, FL	2.01
Parkersburg, WV	2.75		

TABLE 2. Selected stations with temperatures averaging greater than $7^{o}F$ ABOVE normal for the week.

Station	TDepNml	AvgT(^{o}F)	Station	TDepNml	AvgT(^{o}F)
Waterloo, IA	+14	84	Dayton, OH	+9	82
St. Louis, MO	+11	88	Chicago/O'Hare, IL	+9	81
Springfield, IL	+11	85	La Crosse, WI	+9	80
Des Moines, IA	+11	85	Spencer, IA	+9	79
Ottumwa, IA	+11	85	Aberdeen, SD	+9	79
Quincy, IL	+11	85	Madison, WI	+9	78
Peoria, IL	+11	84	Rochester, MN	+9	77
Moline, IL	+11	84	Eau Claire, WI	+9	77
Rockford, IL	+11	82	Nashville, TN	+8	86
Burlington, IA	+10	85	Raleigh-Durham, NC	+8	85
Indianapolis, IN	+10	83	Belleville/Scott AFB, IL	+8	85
Cedar Rapids, IA	+10	82	Greensboro, NC	+8	84
Mason City, IA	+10	80	Evansville, IN	+8	84
Seymour-Johnson AFB, NC	+ 9	88	Lexington, KY	+8	83
Kansas City Muni., MO	+ 9	88	North Omaha, NE	+8	83
Kansas City Intl., MO	+ 9	87	Sioux City, IA	+8	81
Paducah, KY	+ 9	86	Sioux Falls, SD	+8	80
Louisville, KY	+ 9	85	South Bend, IN	+8	79
Cincinnati, OH	+ 9	83	Bluefield, WV	+8	78
Jackson, KY	+ 9	83	Beckley, WV	+8	77

WEEKLY WEATHER FEATURES

WEEK ENDING AUG 20, 1988



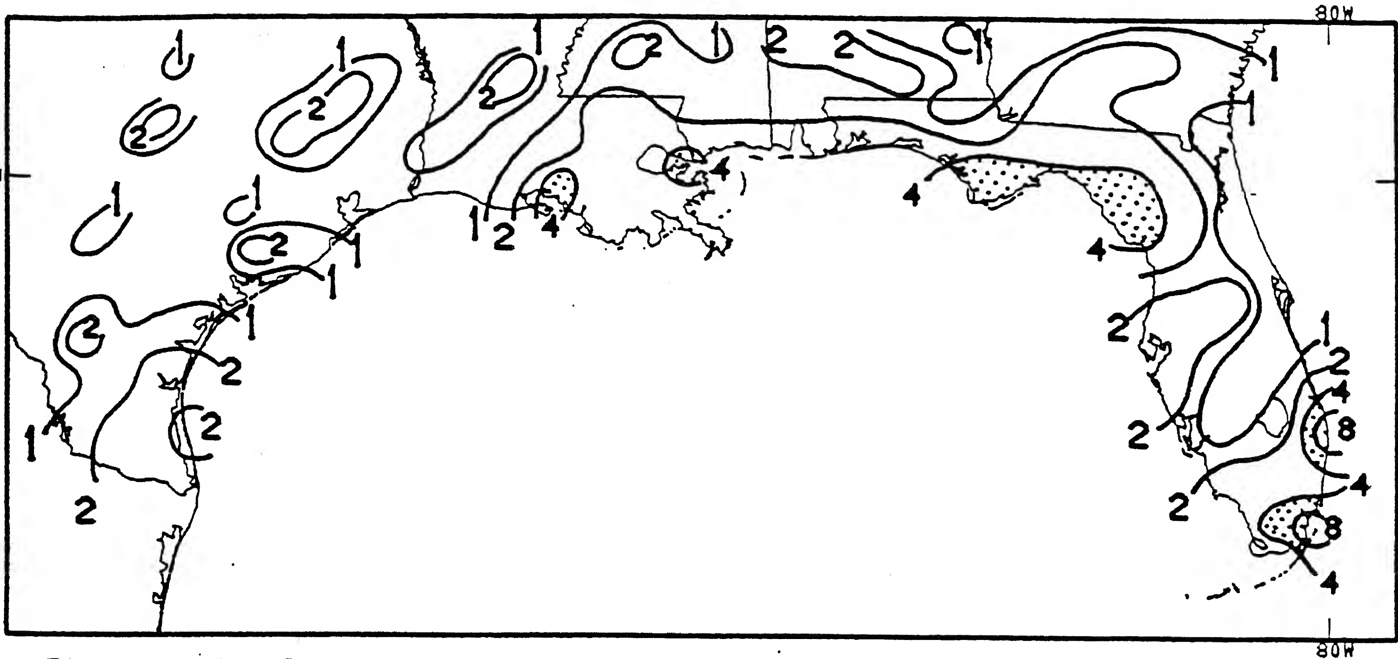


Figure 1. Total precipitation (inches) during Aug. 14-20, 1988. Only isopleths of 1, 2, 4, and 8 inches are shown, and stippled areas are more than 4 inches. Torrential showers from a tropical disturbance produced over 10 inches of precipitation at a few stations in southeastern Florida.

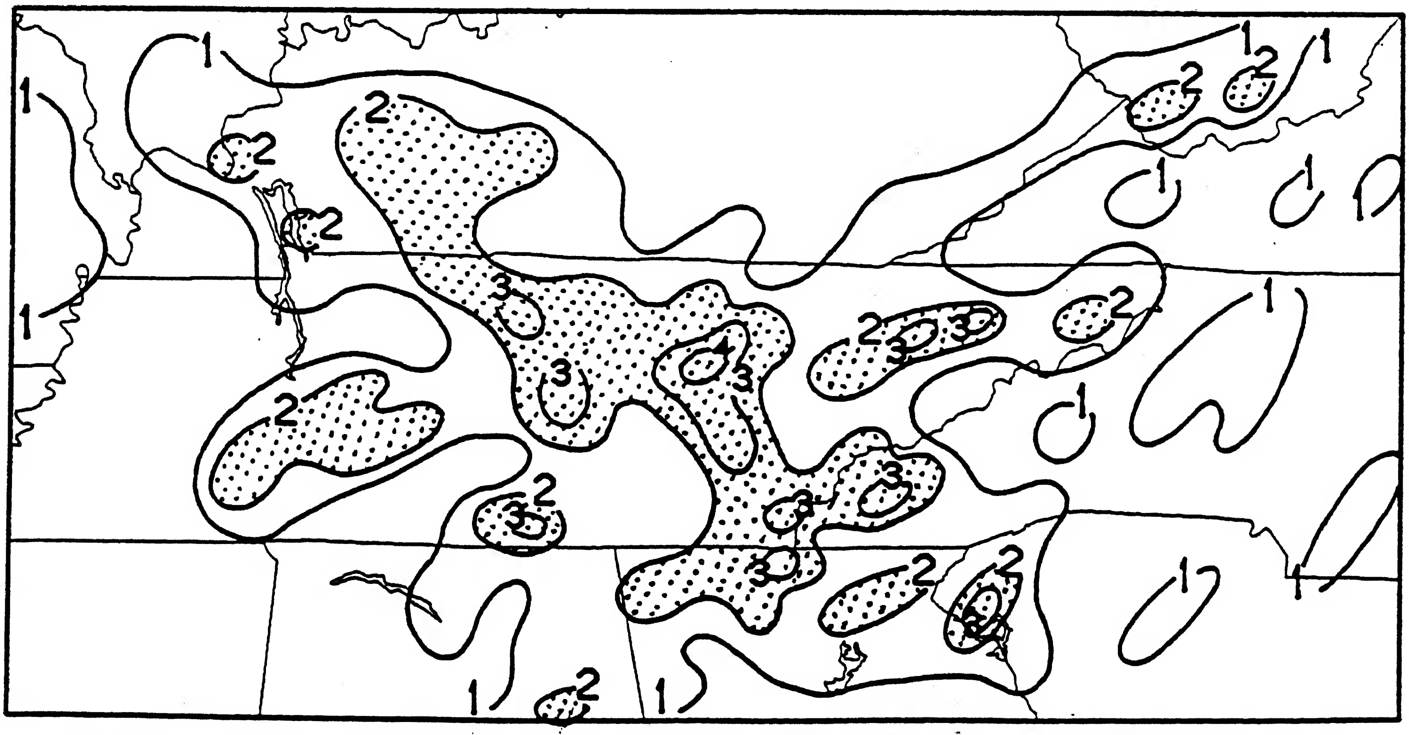
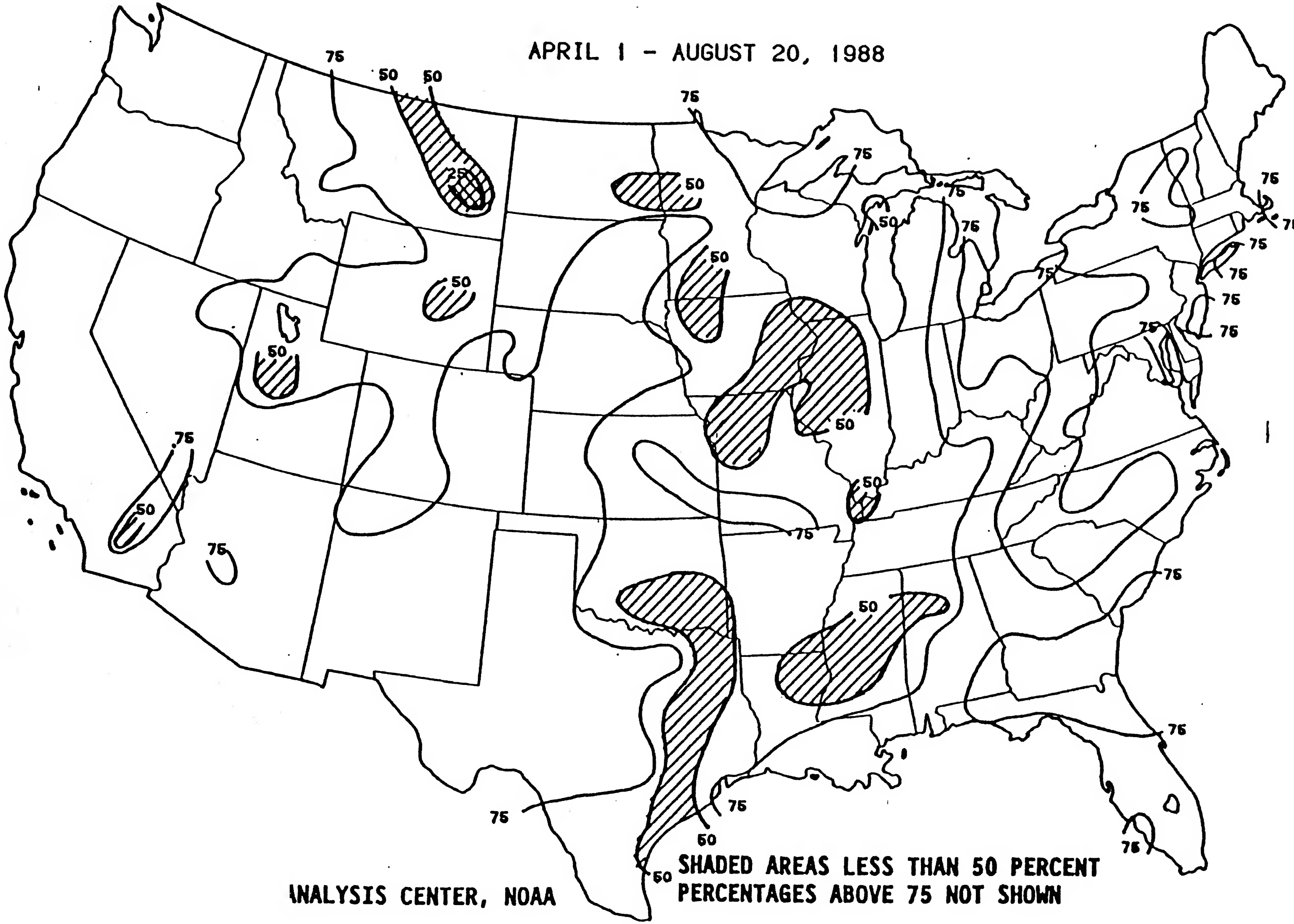


Figure 2. Total precipitation (inches) from 8/14-8/20/88. Only isopleths of 1, 2, 3, and 4 inches are depicted, and stippled areas are greater than 2 inches. A cold front stalled over the Tennessee Valley and triggered showers and thunderstorms (up to 4.7 inches) that provided welcome relief from both short and long term dryness.

PERCENTAGE OF NORMAL PRECIPITATION

APRIL 1 - AUGUST 20, 1988



ANALYSIS CENTER, NOAA

SHADED AREAS LESS THAN 50 PERCENT
PERCENTAGES ABOVE 75 NOT SHOWN

rmal precipitation since April 1, 1988. Only contours of 25, 50, and 75% were than 50%. Moderate rainfall across the Mississippi, Ohio, and Tennessee has decreased the areal coverage of regions that have received less than ince April 1. A large portion of the eastern U.S., however, has measured pitation.

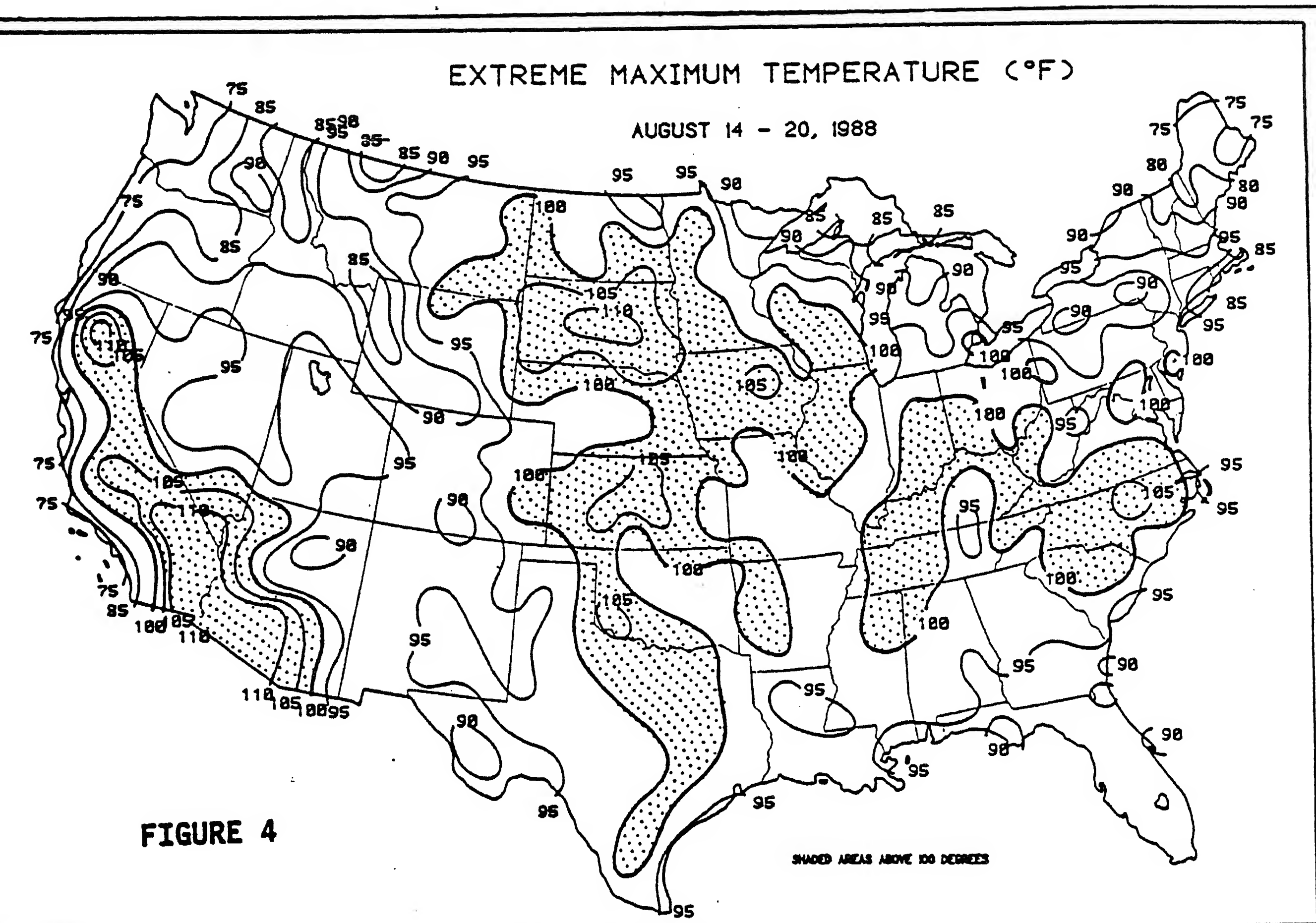
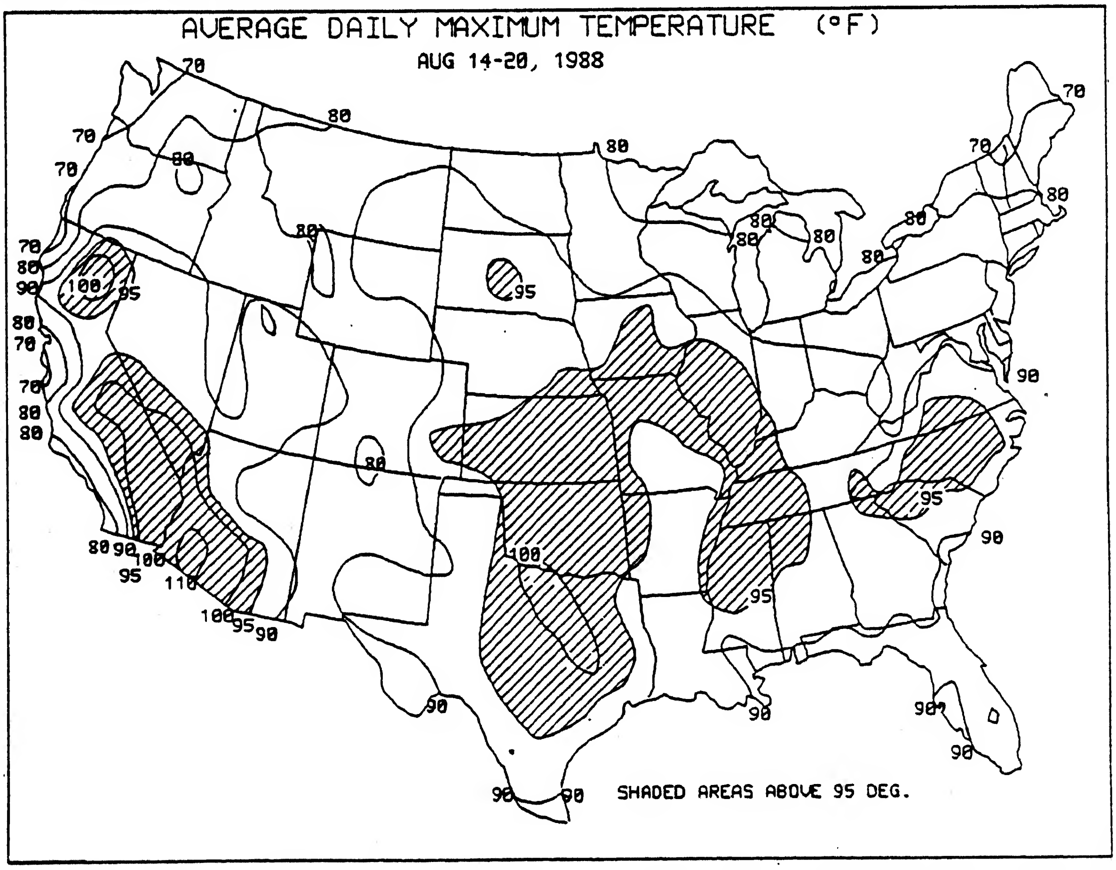
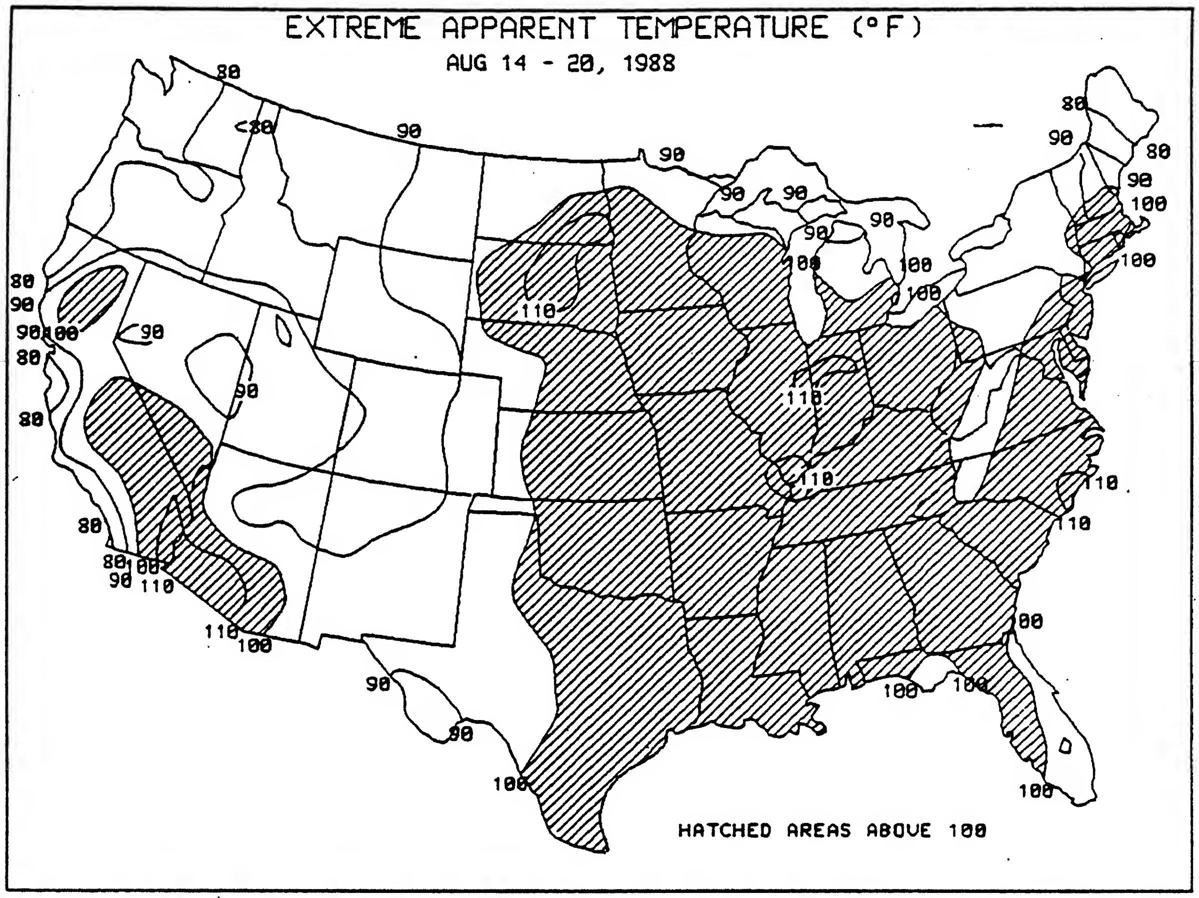


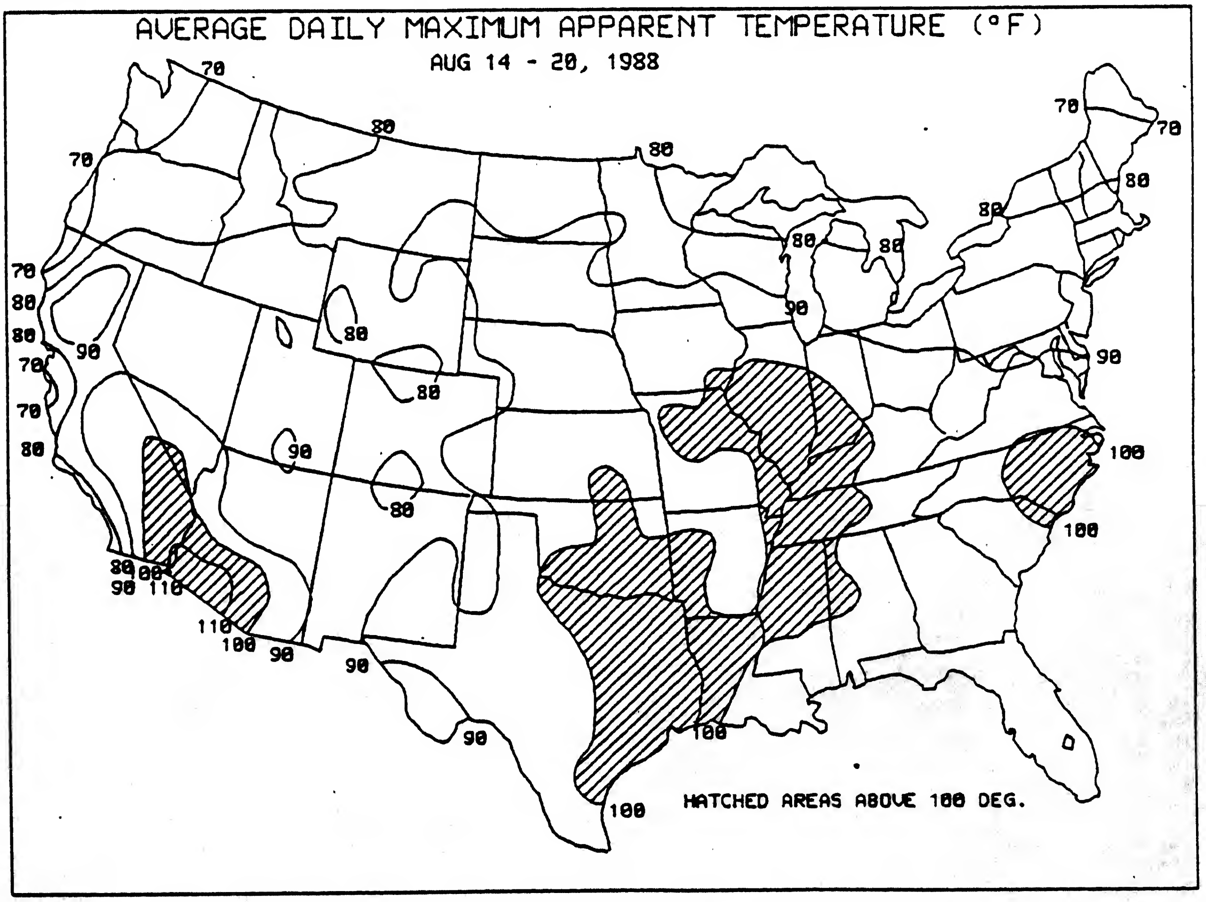
FIGURE 4

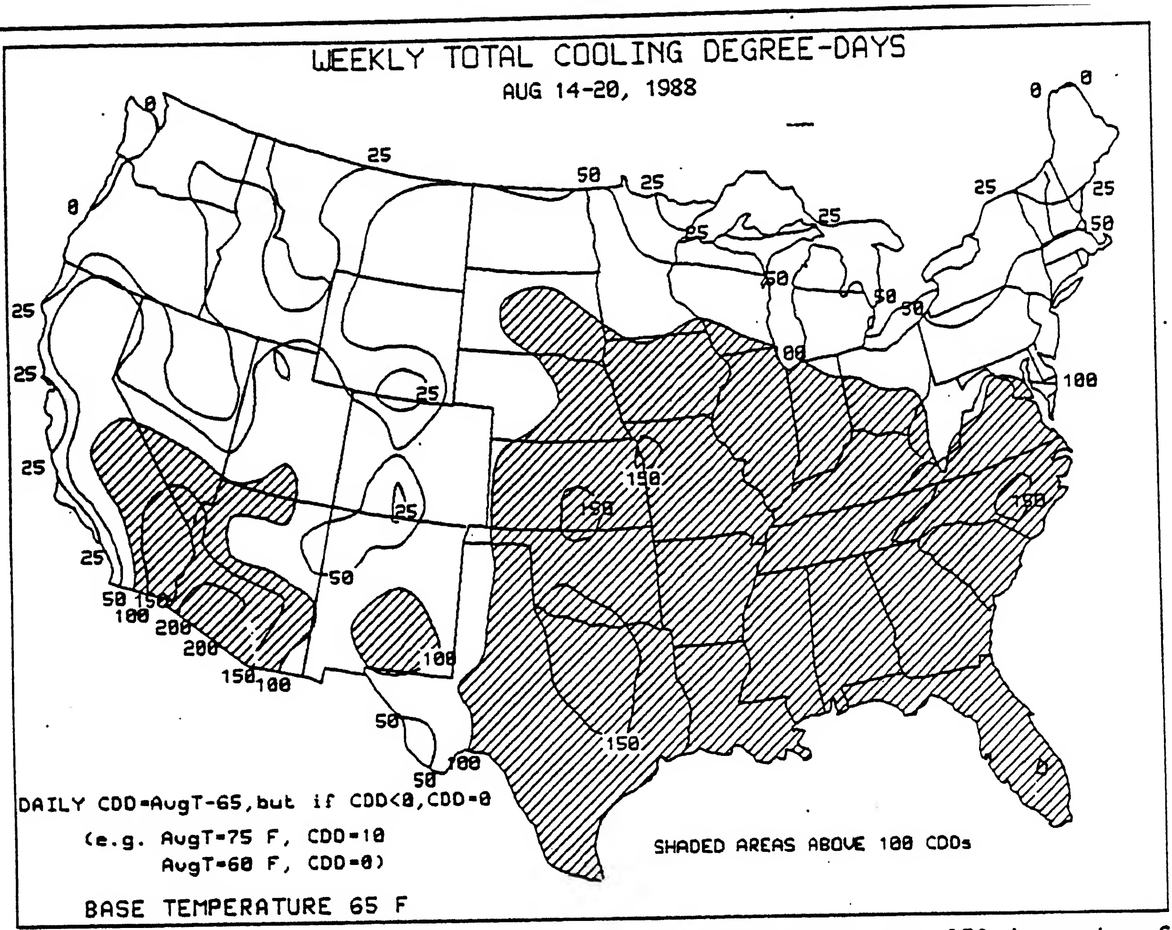
Highs reached and exceeded the century mark in the Great Plains, Midwest, Southeast, and mid-Atlantic regions as this summer's abnormally hot weather continued (top), and maximum temperatures AVERAGED in the upper nineties to lower one hundreds throughout the southern Great Plains, the Middle Mississippi Valley, and the Carolinas (bottom).



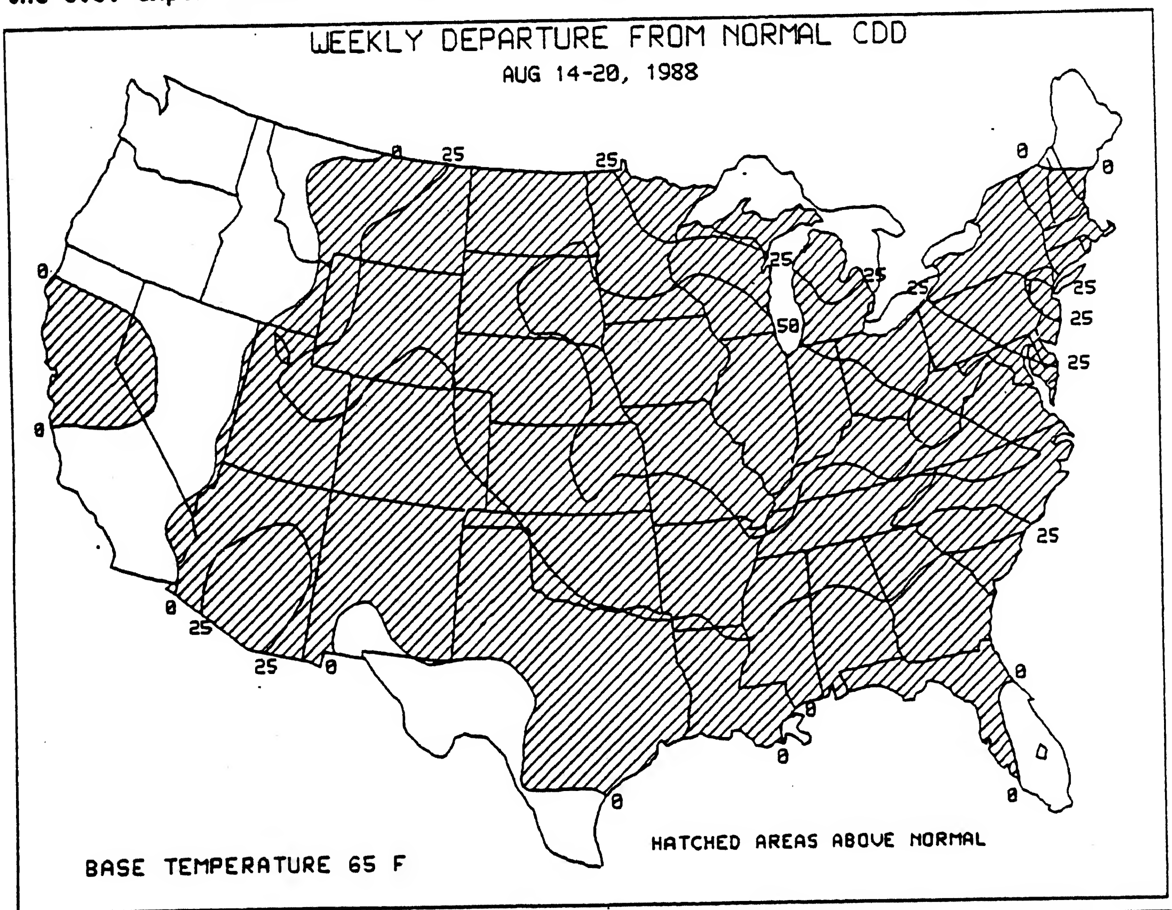


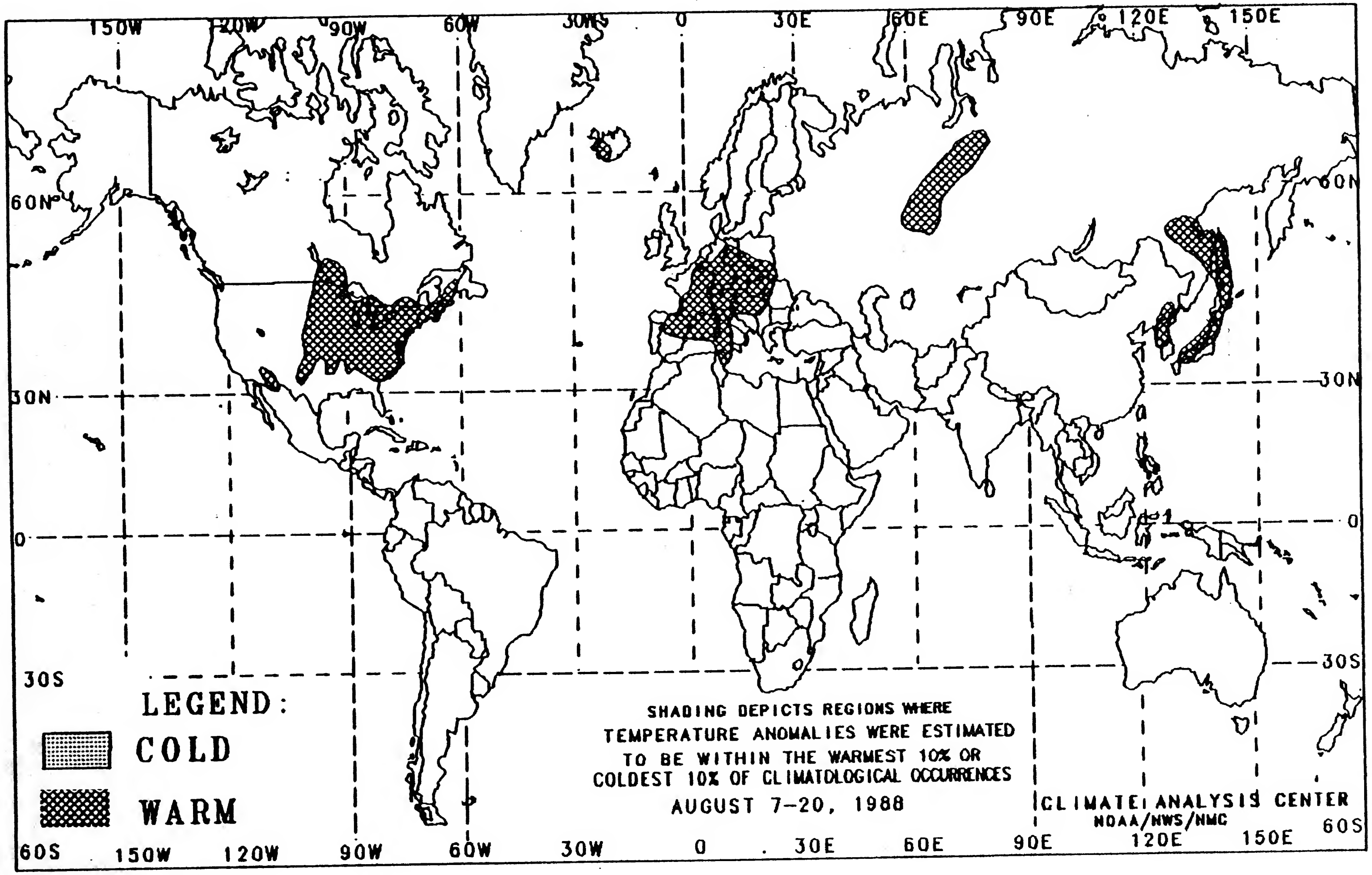
Dangerous apparent temperatures (>=105°F) afflicted parts of the central Great Plains, Midwest, and southern Atlantic regions as high humidity and temperatures in the upper nineties and lower one hundreds were prevalent (top); much of the South, Middle Mississippi Valley, and coastal Carolinas endured weekly maximum apparent temperatures that AVERAGED over 100°F (bottom).





Relentless warmth pushed weekly total cooling degree days over 150 in parts of the Great Plains and Carolinas (top), while most of the eastern two-thirds of the U.S. experienced an unusually high demand for air conditioning (bottom).





The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

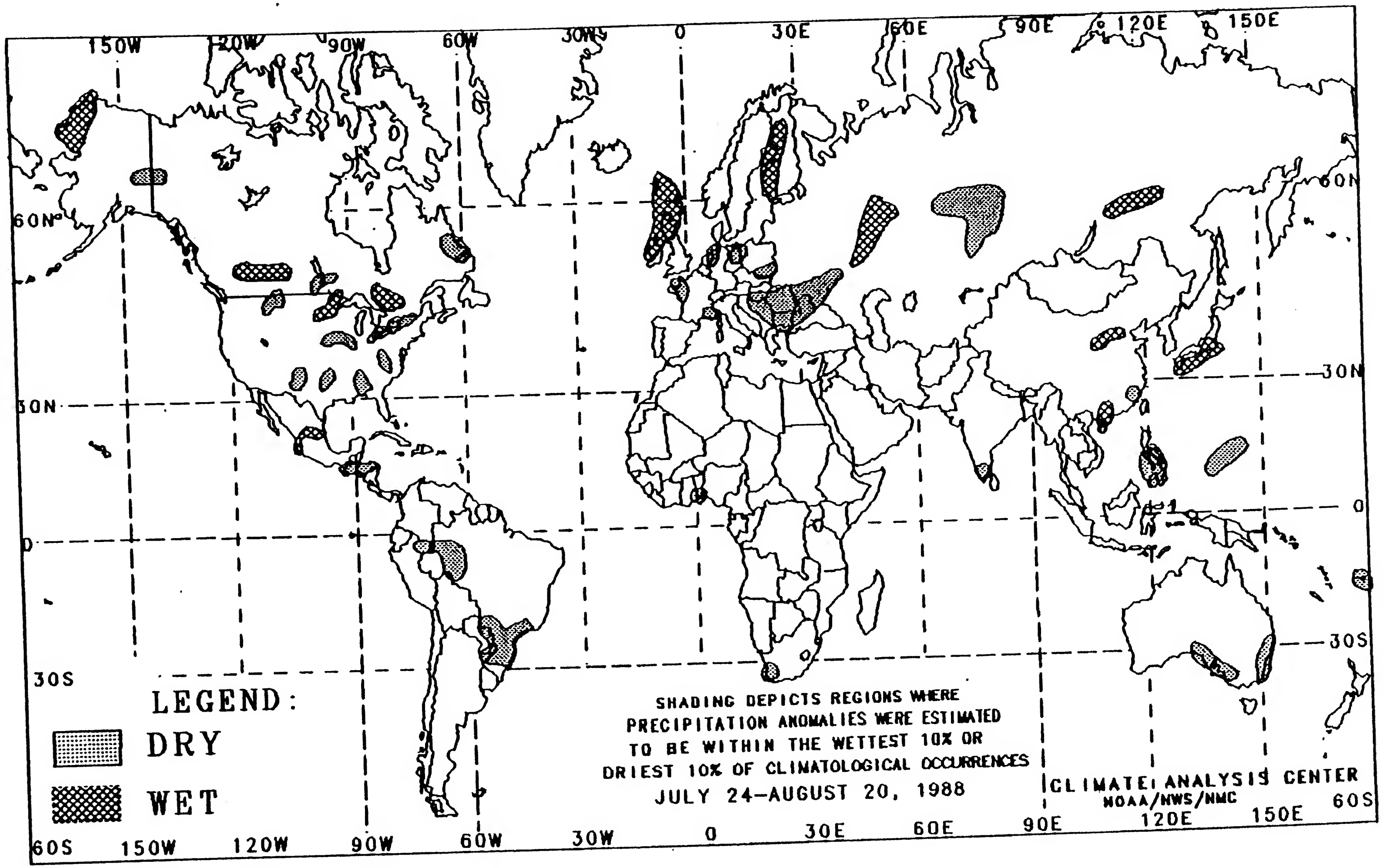
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining precentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 Week

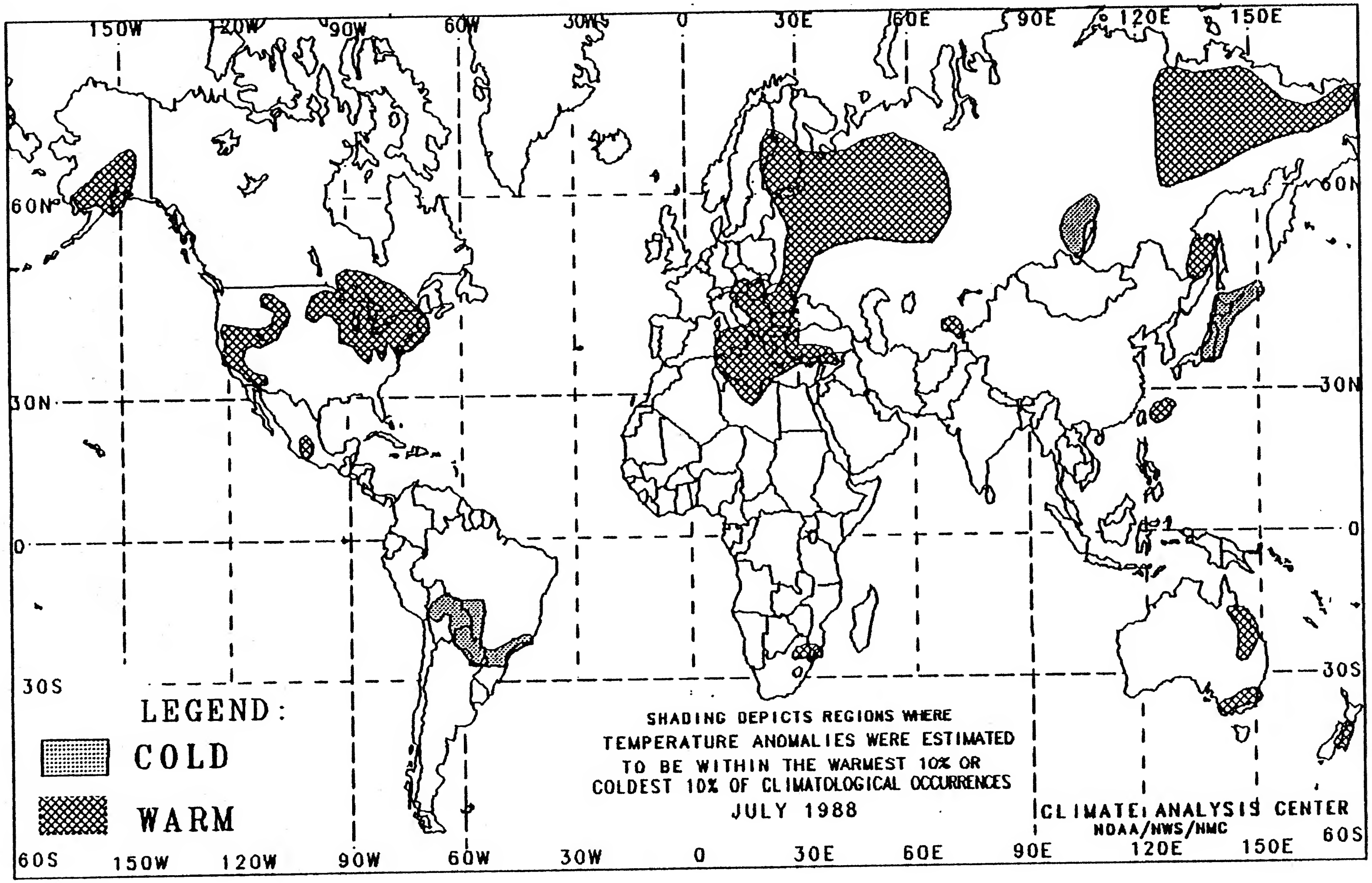


The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.



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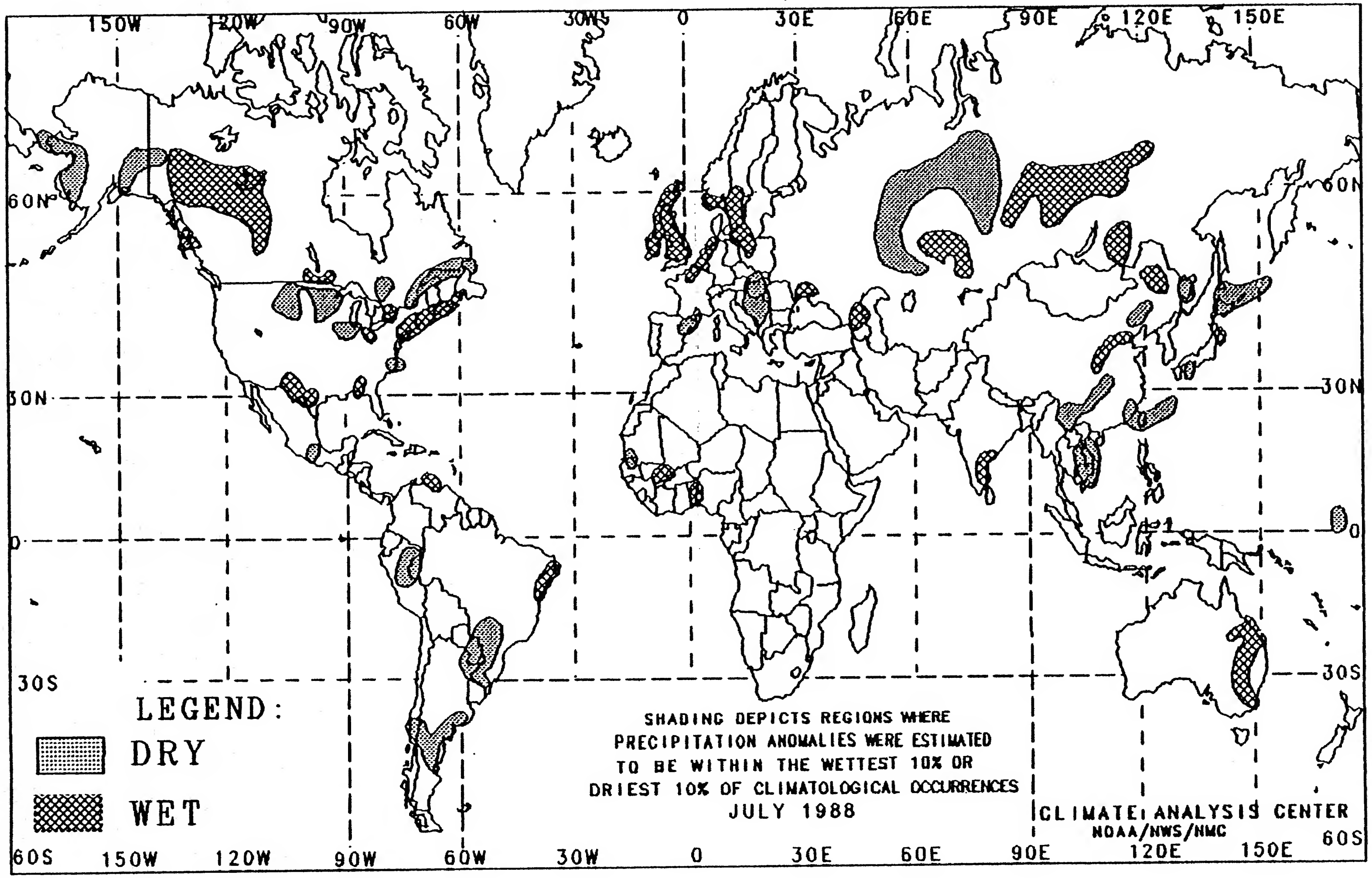
PRINCIPAL TEMPERATURE ANOMALIES - JULY 1988

REGIONS AFFECTED	TEMPERATURE AVERAGE (C)	DEPARTURE FROM NORMAL (C)	COMMENTS
SOUTH CENTRAL ALASKA	+13 TO +19	+2 TO +3	VERY WARM MIDDLE OF JULY
WESTERN UNITED STATES	+19 TO +36	+2 TO +3	VERY WARM LATE IN JULY
NORTHEASTERN UNITED STATES AND ADJACENT CANADA	+19 TO +28	+2 TO +3	VERY WARM FIRST HALF OF JULY
CENTRAL MEXICO	+20 TO +21	AROUND +2	VERY WARM FIRST HALF OF JULY
CENTRAL SOUTH AMERICA	0 TO +21	-2 TO -4	VERY COLD FIRST HALF OF JULY
EASTERN EUROPE, WESTERN SOVIET UNION, AND NORTHERN AFRICA	+18 TO +31	+2 TO +5	VERY WARM EARLY AND LATE IN JULY
NORTHEASTERN SOUTH AFRICA AND EXTREME SOUTHERN MOZAMBIQUE	+11 TO +20	AROUND +2	VERY WARM EARLY AND LATE IN JULY
KIRGIZ S.S.R. AND UZBEK S.S.R.	+27 TO +29	+2 TO +3	VERY WARM MIDDLE OF JULY
SOUTH CENTRAL SIBERIA	+14 TO +16	-2 TO -4	VERY COLD EARLY IN JULY
EASTERN SIBERIA	+6 TO +21	+2 TO +5	VERY WARM SECOND HALF OF JULY
SOUTHEASTERN SIBERIA	+19 TO +23	+2 TO +3	WARM - 4 TO 8 WEEKS
JAPAN AND KURIL ISLANDS	+6 TO +22	-2 TO -4	VERY COLD SECOND HALF OF JULY
RYUKYU ISLANDS	AROUND +30	AROUND +2	WARM - 8 WEEKS
NORTHEASTERN AUSTRALIA	+13 TO +26	AROUND +2	VERY WARM FIRST HALF OF JULY
SOUTHEASTERN AUSTRALIA	+7 TO +11	AROUND +2	VERY MILD EARLY IN JULY
NEW ZEALAND	+8 TO +10	AROUND +2	VERY MILD EARLY AND LATE IN JULY



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

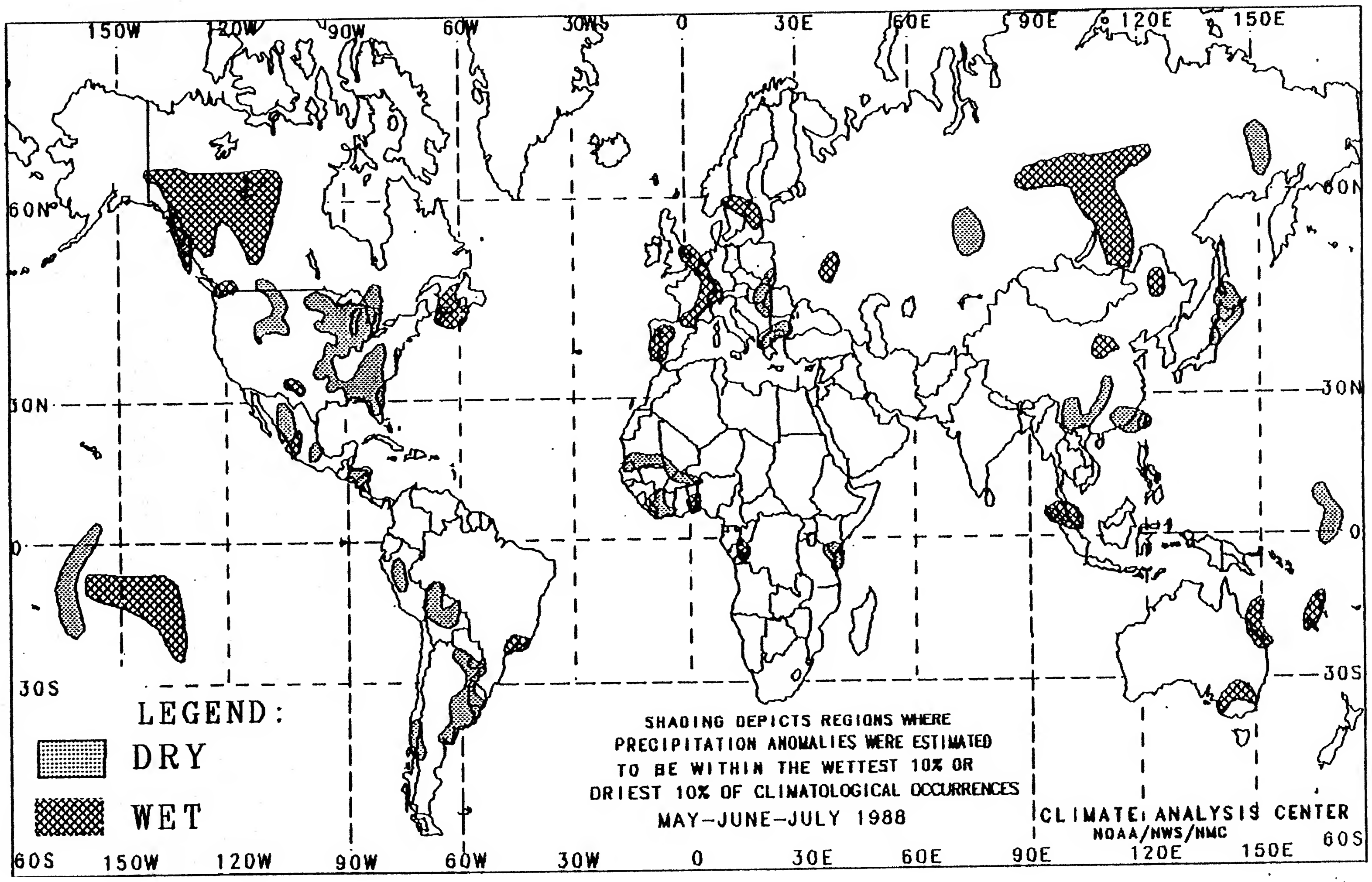
In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
WESTERN ALASKA	2 TO 11	4 TO 21	DRY - 6 TO 8 WEEKS
EASTERN ALASKA AND ADJACENT CANADA	1 TO 83	3 TO 49	DRY - 4 TO 6 WEEKS
WESTERN CANADA	81 TO 219	182 TO 324	WET - 6 TO 16 WEEKS
BRITISH COLUMBIA	170 TO 287	197 TO 249	WET - 8 WEEKS
SOUTHERN MANITOBA	123 TO 213	186 TO 280	WET - 4 WEEKS
EAST CENTRAL ONTARIO	30 TO 44	36 TO 49	DRY - 4 TO 6 WEEKS
SOUTHEASTERN ONTARIO AND WESTERN NEW YORK	189 TO 638	168 TO 816	WET - 4 WEEKS
ST. LAWRENCE RIVER VALLEY	29 TO 67	38 TO 66	DRY - 4 TO 6 WEEKS
NORTH CENTRAL UNITED STATES	1 TO 38	3 TO 36	DRY - 4 TO 26 WEEKS
NORTHERN ILLINOIS AND NORTHWESTERN INDIANA	3 TO 46	2 TO 49	DRY - 18 TO 26 WEEKS
NORTHEASTERN INDIANA AND NORTHWESTERN OHIO	166 TO 198	191 TO 196	HEAVY PRECIPITATION SECOND HALF OF JULY
COASTS OF NORTHEASTERN UNITED STATES AND MARITIME PROVINCES	143 TO 263	167 TO 286	WET - 6 TO 8 WEEKS
EASTERN NORTH CAROLINA	40 TO 71	36 TO 41	DRY - 4 WEEKS
SOUTHERN ALABAMA AND WESTERN FLORIDA	264 TO 388	208 TO 218	HEAVY PRECIPITATION MIDDLE OF JULY
SOUTHEASTERN NEW MEXICO AND SOUTHERN TEXAS	86 TO 216	206 TO 391	WET - 8 TO 26 WEEKS
SOUTH CENTRAL MEXICO	0 TO 80	0 TO 33	DRY - 6 TO 12 WEEKS
NORTHERN VENEZUELA	64 TO 98	178 TO 287	HEAVY PRECIPITATION LATE IN JULY
PERU AND ADJACENT BRAZIL	0 TO 79	0 TO 46	DRY - 6 TO 16 WEEKS
EASTERN BRAZIL	293 TO 781	164 TO 294	HEAVY PRECIPITATION MIDDLE OF JULY
SOUTHERN BRAZIL, EASTERN PARAGUAY, AND NORTHEASTERN ARGENTINA	0 TO 60	0 TO 49	DRY - 6 TO 19 WEEKS
CENTRAL ARGENTINA AND CENTRAL CHILE	0 TO 146	0 TO 46	DRY - 6 TO 26 WEEKS
BRITISH ISLES	104 TO 278	173 TO 263	WET - 6 WEEKS
BENELUX COUNTRIES AND NORTHEASTERN FRANCE	102 TO 176	178 TO 261	WET - 6 WEEKS

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
SOUTHERN SCANDINAVIA AND NORTH CENTRAL POLAND	101 TO 291	176 TO 362	WET - 6 TO 7 WEEKS
SOUTH CENTRAL FRANCE AND NORTHEASTERN SPAIN	0 TO 11	0 TO 28	DRY - 6 WEEKS
SOUTHEASTERN EUROPE	0 TO 36	0 TO 48	DRY - 6 WEEKS
SOUTHERN UKRAINE	83 TO 142	206 TO 298	WET - 4 TO 6 WEEKS
SOVIET GEORGIA	110 TO 194	232 TO 366	WET - 6 WEEKS
SENEGAL	6 TO 18	7 TO 28	DRY - 16 TO 23 WEEKS
SOUTH CENTRAL MALI	381 TO 489	163 TO 191	HEAVY PRECIPITATION MIDDLE OF JULY
BENIN	266 TO 323	171 TO 196	HEAVY PRECIPITATION MIDDLE OF JULY
WESTERN SIBERIA	2 TO 48	6 TO 49	DRY - 3 TO 26 WEEKS
NORTH CENTRAL KAZAKH S.S.R.	92 TO 147	284 TO 388	WET - 4 TO 8 WEEKS
CENTRAL SIBERIA	96 TO 187	163 TO 278	WET - 4 TO 11 WEEKS
SOUTH CENTRAL SIBERIA	146 TO 236	268 TO 383	HEAVY PRECIPITATION MIDDLE OF JULY
NORTH CENTRAL MANCHURIA	214 TO 334	197 TO 287	WET - 6 WEEKS
NORTHEASTERN MANCHURIA	44 TO 69	36 TO 46	DRY - 7 TO 13 WEEKS
NORTHWESTERN MANCHURIA	46 TO 83	26 TO 46	DRY - 6 WEEKS
EAST CENTRAL CHINA	188 TO 483	171 TO 293	WET - 6 TO 26 WEEKS
SOUTH CENTRAL CHINA	11 TO 164	6 TO 61	DRY - 4 TO 7 WEEKS
SOUTHEASTERN INDIA	126 TO 468	222 TO 386	WET - 6 TO 8 WEEKS
INDOCHINA PENINSULA	12 TO 128	12 TO 47	DRY - 6 TO 9 WEEKS
SOUTHEASTERN CHINA, TAIWAN, AND RYUKYU ISLANDS	7 TO 291	4 TO 68	DRY - 6 TO 11 WEEKS
WESTERN JAPAN	68 TO 232	26 TO 68	DRY - 6 WEEKS
NORTHERN HONSHU, JAPAN	232 TO 368	201 TO 213	WET - 4 TO 6 WEEKS
HOKKAIDO, JAPAN AND KURIL ISLANDS	1 TO 68	2 TO 49	DRY - 7 TO 11 WEEKS
KIRIBATI ISLANDS	18 TO 113	12 TO 47	DRY - 14 TO 21 WEEKS
EASTERN AUSTRALIA	68 TO 269	202 TO 984	WET - 4 TO 17 WEEKS

3 Month



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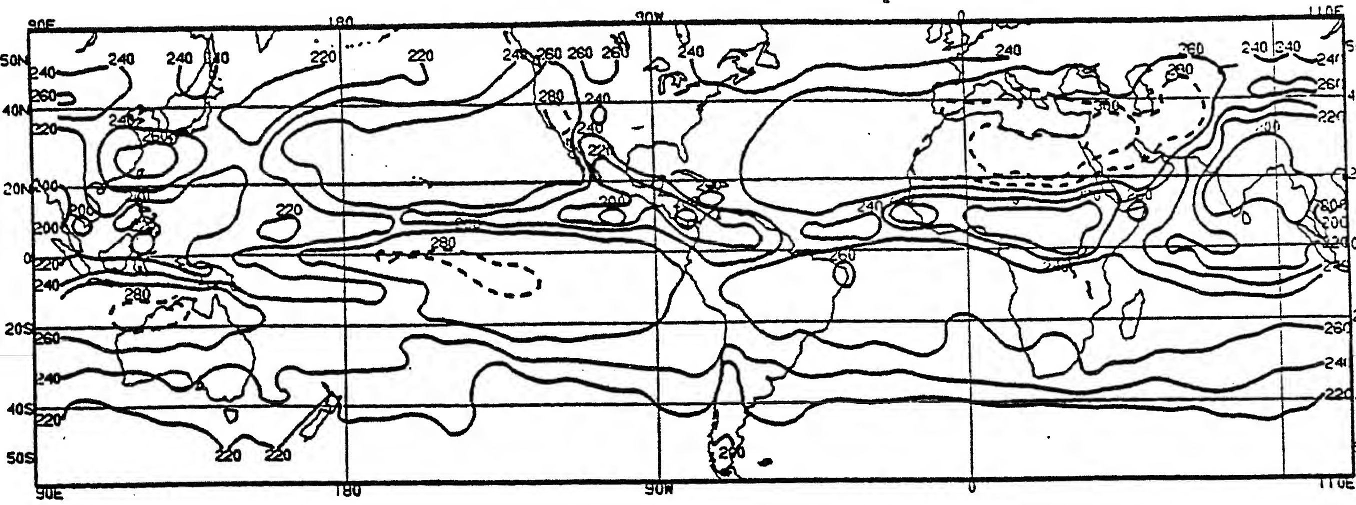
In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

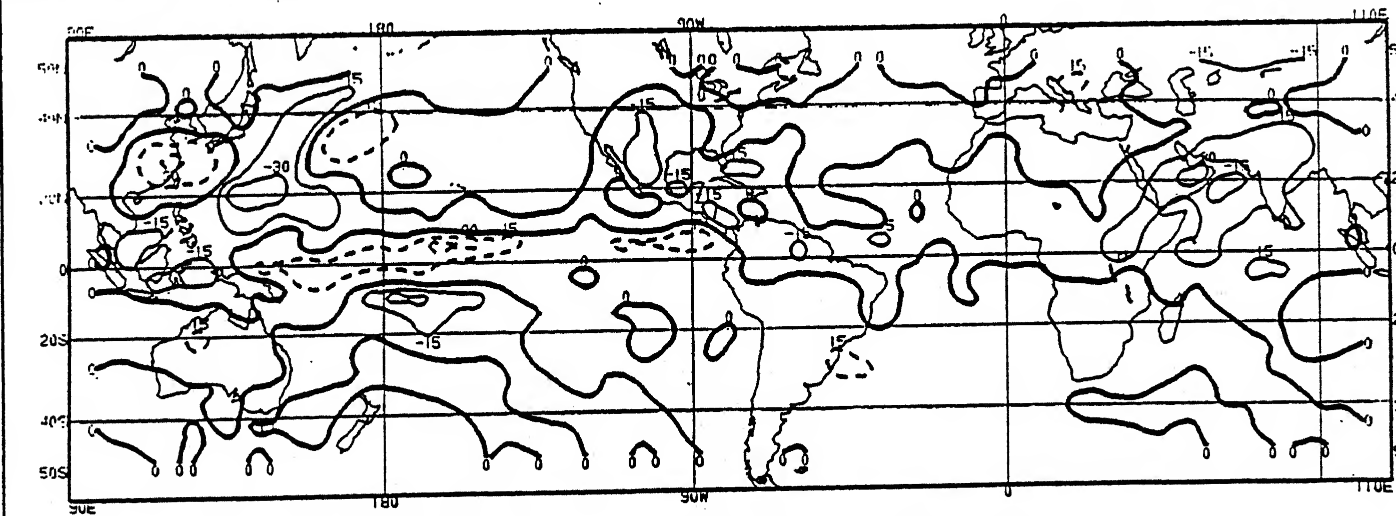
The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.



Monthly Mean Outgoing Longwave Radiation (OLR) for July 1988.

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA-9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over 2.5^{o} areas to a 5^{o} mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes $20^{o}N$-$20^{o}S$) that receive primarily convective rainfall, a mean OLR value of less than 220 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non-convective, or in some tropical coastal or island locations, where the precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1974-1983 base period mean (1978 missing). Contour intervals are 15 Wm^{-2}, while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) are solid.



Monthly Mean Outgoing Longwave Radiation (OLR) Anomaly for July 1988.

UPDATE OF THE 1988 INDIAN MONSOON SEASON

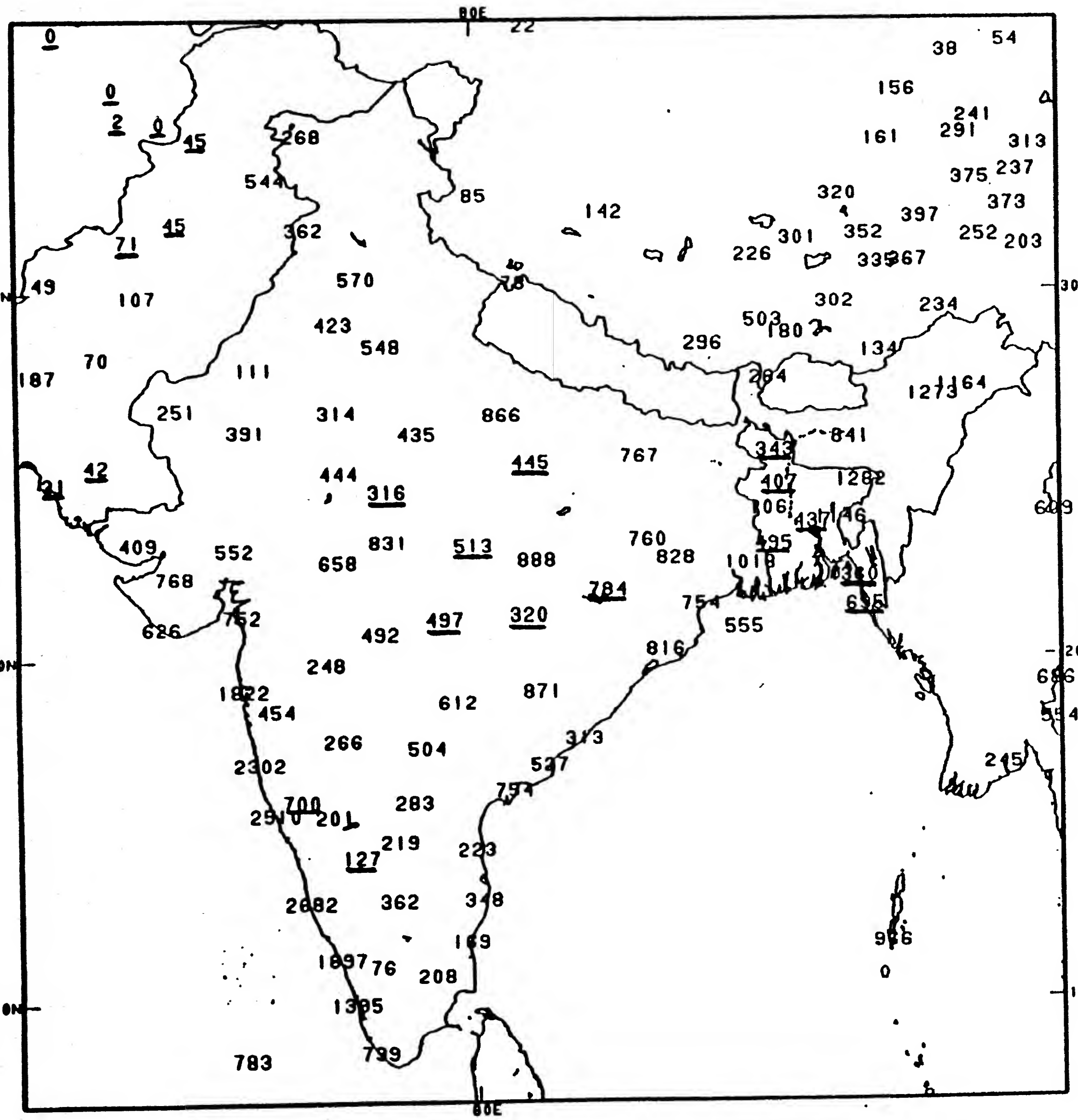
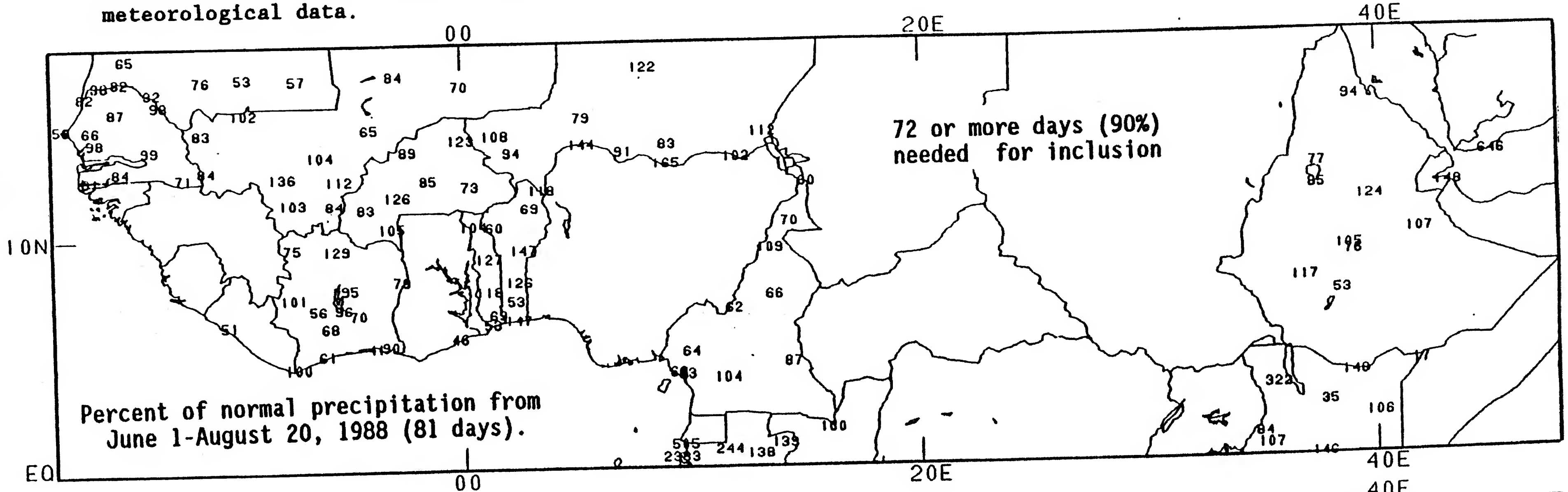


Figure 1. Total precipitation (mm) during June 1-August 20, 1988 (81 days). 72 or more days were required for a station to be included (90%). Most locations continued to record near to above normal precipitation.

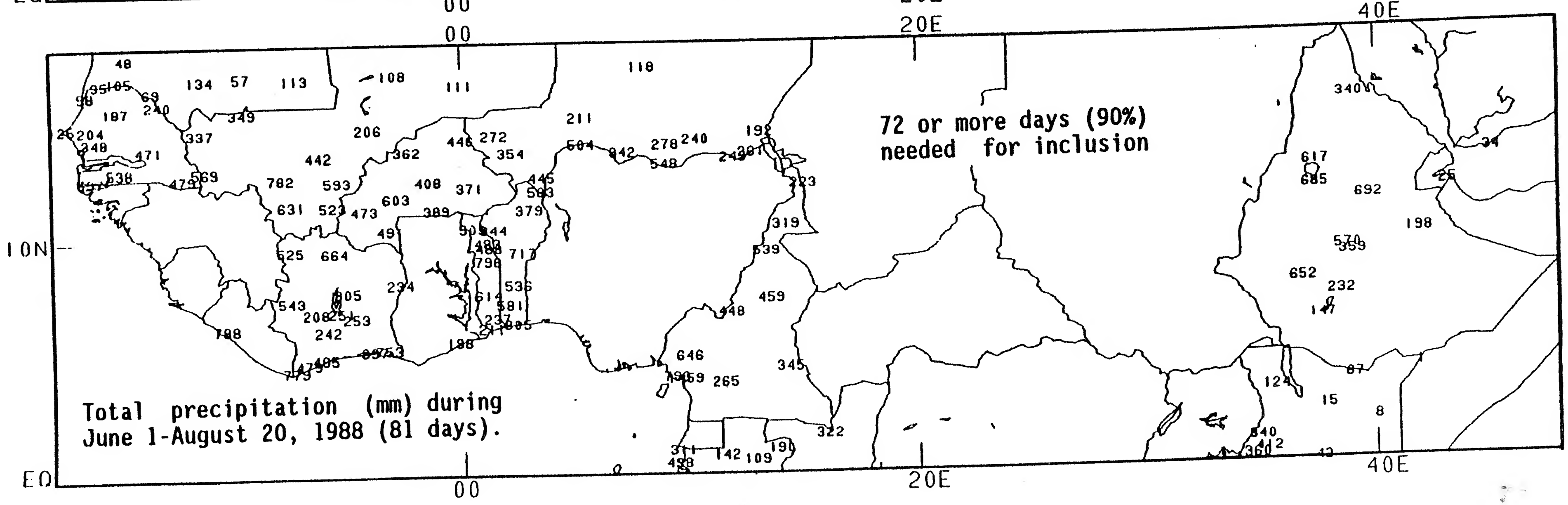
The 1988 Indian monsoon season (usually from June-September) has generally produced near to above normal precipitation totals for much of India, Bangladesh, and Pakistan (see front cover). Since the last review (see Weekly Climate Bulletin dated July 23, 1988), most locations have maintained favorable moisture regimes. Furthermore, over the past four weeks, significant rainfall has greatly increased seasonal percentages of normal precipitation in east-central Pakistan and the Indian states of Punjab (north-central India), Rajasthan (western India), Madras (extreme southeastern India), and Andhra Pradesh (southeastern India).

Since normal seasonal precipitation amounts are quite large, especially along India's western coast, accumulated rainfall values over the past two and one-half months generally exceed 500 mm (see Figure 1). Even at stations where less than 75% of normal precipitation had fallen (underlined locations in Figure 1), substantial rainfall was measured. Reports of severe flooding in Bangladesh and northern India, quite numerous in late June and July, have eased in recent weeks as the frequency of torrential downpours have diminished. Based upon past occurrences, there should still be several more weeks of considerable rainfall in India as the monsoon normally starts its southeasterly retreat in September from Pakistan and extreme northwestern India and reaches central India by the first half of October.

Since the last review (see Weekly Climate Bulletin dated July 23, 1988), precipitation has generally increased at most locations that were below normal four weeks ago and decreased at areas that had received ample rainfall through July 23. For example, stations in central and northern Ethiopia, central and southern Mali, Senegal, and southern Mauritania have edged closer to or surpassed their normal accumulated seasonal precipitation amounts, while regions with previously excessive rainfall had diminished during the past month in parts of southern Niger, Cote d'Ivoire, and western Burkina Faso. During late July and early August, torrential thunderstorms in east-central Sudan and at upstream Nile River watersheds combined to produce the worst flooding this century at Khartoum and other northern Sudanese cities along the Nile River, according to press reports and supported by satellite (Meteosat) images and unofficial meteorological data.



Percent of normal precipitation from June 1-August 20, 1988 (81 days).



Total precipitation (mm) during June 1-August 20, 1988 (81 days).